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# TECHNICAL NOTES

LAKE STATES FOREST EXPERIMENT STATION  
U.S. DEPARTMENT OF AGRICULTURE · · FOREST SERVICE  
No. 572

Blister Rust Spread is General in North,  
Local in South Wisconsin During 1958

During 1958 a program of observing the specific periods when various blister rust stages develop during the season was inaugurated by the Station with the aid of Blister Rust Control personnel of the North Central Region.<sup>1/</sup> Hitherto the lack of such information has limited the possibilities of correlating weather data with the stages of rust.

Between 1938 and 1957 some sporadic records were made of blister rust infection on Ribes.<sup>2/</sup> In general, most Ribes were defoliated because of rust infection by mid-August most years. Leaves were retained longer in 1951 and 1956 with apparent resultant increases in rust spread. Ribes defoliation histories through 1953 have been summarized by Van Arsdel.<sup>3/</sup>

Development of Rust on Ribes

Active aeciospore release in the north central States in 1958 was noted from April 29 at Hanover in southern Michigan to July 9 at Austin in southern Minnesota. Aeciospore release periods appeared to be shorter farther north.

Because of generally cool, dry weather in the early summer, uredial spread on Ribes was light and fairly late. Southern Michigan had little rust on Ribes and early drought defoliation of infected leaves. Northern Lower Michigan had widespread uredial rust by July 30, widespread telia by August 18, and heavy defoliation by September 18.

In southern Wisconsin uredia were noted July 16 south of Mineral Point; telia were noted July 31. Ribes infection never occurred on more than about 10 percent of the Ribes leaves, and defoliation was completed in mid-October. In northeastern Wisconsin more uredia were noted starting around June 15 and were general by July 23, with telia becoming fairly common by August 21. Defoliation was generally complete by September 26.

Southern Minnesota was sampled only once, but heavy uredia and telia were present July 8-11. With local exceptions, less than 15 percent of the northern Minnesota Ribes leaves had uredial infection.

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<sup>1/</sup> The authors wish to acknowledge the aid of Ray Weber and William Munyon of Blister Rust Control, who contributed observations on site and related rust stages in northeastern Wisconsin and Lower Michigan.

<sup>2/</sup> In 1938 to 1941 E. E. Honey, U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering, kept detailed records in much of the North Central Region. In 1943 A. J. Riker, University of Wisconsin, and T. F. Kouba, then with the U. S. Bureau of Entomology and Plant Quarantine, kept records at Wisconsin Rapids. From 1951 to 1954 and late 1956 to 1957 the senior author of this Note kept some records.

<sup>3/</sup> Van Arsdel, E. P. Climatic factors affecting the distribution of white pine blister rust in Wisconsin. Ph. D. Thesis, University of Wisconsin. 1954.

In all reported areas except southern Michigan defoliation of infected *Ribes* leaves was late, mostly because of low infection levels. This late defoliation gave better chances of fall pine infection. The amount of uredial infection increased from east to west and from south to north.

#### Spread of Rust to Pine

Repeated tests of teliospore fertility and spore-trap checks were made at Madison and about 20 miles south of Iron River, Mich. These studies raise some questions about the spread of sporidia and the weather favoring this spread.

In the area south of Iron River fertile teliospores that had released no sporidia were present August 19. On August 29, 30, and 31 three days of cool, humid, rainy weather occurred. On September 4 all teliospores present in a large sample had released their sporidia and had only empty sterigmata left. In subsequent September tests only a very rare telium was found to be able to produce sporidia. The presumptive evidence is strong that all sporidia were released in the one 3-day favorable period. Spore traps were not operating during the 3-day period, but the negative results from prior and later periods substantiated the limited release time.

Near Madison fertile telia were present on *Ribes nigrum* leaves on October 6. After 2 rainy, humid days (100-percent relative humidity on hair hygrometer), on the morning of October 9, sporidia had not been released from the basidia. These sporidia remained attached to the basidia for nearly a month until all leaves were dropped by the plant. However, sporidia had been released on water agar in Petri dishes where additional moisture was supplied and the sporidia were exposed to the same temperatures. From previous laboratory tests it seemed logical that the sporidia in the field should have been released in the wet period, but no spores were trapped and all could be accounted for as still attached to the basidia.

This year's observations of sporidial release seem to reinforce some previous observations that sporidia are released in mass. Sporidia were released all at once in a 3-day wet period in northern Wisconsin. At Madison a 2-day wet period almost completed the cycle but was not quite long enough. Spores remained attached to the basidia. The implications are that free water might be a deciding factor in the release of sporidia. (Additional moisture provided for a leaf in a Petri dish top under the same temperature conditions allowed spore discharge.) Our previous laboratory results showing the need of at least 2 days of wet weather might be too conservative. This may be due to the maintenance of supersaturated air in laboratory chambers so that water is constantly being deposited on the spores.

The year 1958 should have a general spread of rust to pine in northeastern Wisconsin, and southern Wisconsin should have local spread in areas with microclimates more favorable than the Madison test site.

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